

Second Grade: Life Science

LOOK AT THAT: Pollinators

Background Information

Pollinators are responsible for moving pollen from one flower to another flower of the same species or from one part of a flower to another part of the same flower. Moving the pollen from the **stamen**, male part of the flower, to the **stigma**, the female part of the flower, completes pollination, and results in the fertilization of a plant so that seeds may be produced to ensure reproduction.

Pollination involves animals such as butterflies, bees, wasps, insects, spiders, hummingbirds, and bats. These animals may deliberately visit a flower to gather pollen or accidentally collect pollen while seeking nectar or nest building materials.

Some animals have structures that assist in the collecting of pollen, which is sticky and barbed. For example, a lemur and bat have fur, bees have fuzzy covered legs, and some birds have a sticky tongue.

Abiotic factors, such as wind and water, also help pollinate plants. Seeds that are produced by pollination may also be dispersed by animals, wind, and/or water.

Pollinators are vital members of ecosystems and contribute to clean air, healthy and stable soil, and generating oxygen. In addition, a large part of the agricultural economy is dependent upon pollinators.

Performance Expectation

2-LS2-2 Ecosystems: Interactions, Energy, and Dynamics

Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

<https://www.nextgenscience.org/pe/2-ls2-2-ecosystems-interactions-energy-and-dynamics>

Disciplinary Core Ideas

LS2.A: Interdependent Relationships in Ecosystems - Plants depend on animals for pollination or to move their seeds around.

ETS1.B: Developing Possible Solutions - Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people.

Science and Engineering Practices

Developing and Using Models - Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.

Develop a simple model based on evidence to represent a proposed object or tool.

Crosscutting Concepts

Structure and Function - The shape and stability of structures of natural and designed objects are related to their function(s).

Objectives

- Students will observe and describe seeds and simulated pollen.
- Develop, design, test, and evaluate models for dispersing seeds and pollinating plants.
- Collect and analyze data to evaluate the functions of a model.
- Students will identify features of animals that help in pollination and/or seed dispersal.

Materials Part 1 Look at That

- Look at That Student Pages
- Hand wipes (optional)
- Flowers (Pollen - if appropriate for your class)
- Variety of Seeds
- Burrs or Similar
- Cup/Container for Seeds & Burrs
- Hand Lens
- Black Paper
- Drawing Paper
- Coloring Supplies

Materials Part 2 Critter

- Critter Student Pages
- Cotton Balls
- Craft Sticks
- Chenille Stems
- Tape
- Wax Paper
- Construction Paper
- Flour or Other Powder to Simulate Pollen
- Scissors
- Glue/Glue Stick
- Student Pages
- Coloring Supplies

Materials Part 3 What are They Doing

- What Are They Doing? Power Point
- Computer
- Projector

Part 1: Look at That

Advanced Preparation

- Buy flowers ahead of time. Try to purchase flowers with a lot of pollen.
- You may wish to have gloves available for students.
- Students will need to wash their hands after touching and working with pollen.
- Plan how materials will be distributed to students. Will they have one material to observe at a time or will they be given all at the same time? Will they pick up the materials from a central location?

Suggested Implementation

Students will observe pollen, seeds, and burrs. Introduce the lesson by asking students questions:

- *What is a seed?*
- *What is pollen?*
- *What is a burr?*
- *Where do pollen, seeds, and burrs come from?*
- *Why do you think plants make pollen, seeds, and burrs?*

Share with students that they will be making observations of pollen, seeds, and burrs. If needed, allow students time to practice using hand lenses. Explain to students that they will use the hand lenses to observe the items. They will be recording their observations by drawing each of the items they examined.

Distribute the materials as you have planned. (Students may need help in locating the pollen in the flowers.) Assist student groups as needed. Collect the materials.

Debrief

Allow time for students to share their experiences.

- *What did you observe about the pollen? The seeds? The burrs?*
- *How were they alike?*
- *How were they different?*
- *Why do plants make pollen, seeds, and burrs?*
- *Do you think the pollen, seeds, and burrs stay in one place? Are ~~they~~ moved from place to place?*

Part 2: Critters

Advanced Preparation:

- Decide what materials will be available for student use to build their pollinators or seed dispersers.
- Decide how materials will be handled.
- If using sidewalk chalk, crush chalk prior to the activity.

- Decide how the testing will occur.
- You may wish to break this lesson into multiple phases:
 - Thinking, planning, designing
 - Building
 - Testing
 - Redesign, rebuild (if completing these stages)

Suggested Implementation

Students will build a pollinator and/or a seed disperser. Introduce the lesson by asking students questions such as:

- *How could pollen get from one flower to another?*
- *How could a seed get from one place in your yard to another?*
- *Why do plants need pollen and seeds to move from one place to another?*

Explain to students that their challenge is to design a “Critter” that will be able to move pollen and/or seeds from one place to another. They will then test their “Critter” to see how well it works.

Have student groups look at the materials available for their design. Encourage them to think about how the materials could be used. Distribute the student planning page to each student so students may draw their idea(s). Allow ample time for students to plan how they will make their “Critter.” Depending upon your students, you may wish to have them share and explain their idea(s) with either a partner or you prior to obtaining materials for building.

When ready, assist students as they assemble their “Critter.” Share how students will test their “Critter.” One suggestion is to provide each student group with a small amount of simulated pollen and/or seeds. Have them test how well their “Critter” is able to pick up and transfer pollen and/or seeds. This can be done by counting the number of seeds that the “Critter” was able to transfer from one place to another.

Pollen can be tracked by placing darker construction paper under the path of the “Critter” and tapping it when it reaches the other side of the paper. Students can observe if pollen fell off on the way to the final destination and how much pollen was dropped at the end.

If time allows, students could redesign and rebuild their “Critter” to see if they are able to improve the function of the “Critter.”

Debrief

Allow time for students to share their experiences.

- *How well did your “Critter” work?*
- *How did your “Critter” move? Did it “Critter” walk, fly, crawl, move some other way?*
- *What special body parts did you put on your “Critter” to help it work?*

Part 3: What are they doing?

Suggested Implementation

Either in pairs or groups of four have students share details about their “Critter.” Show the power point and allow time for observation, discussion, and questions about each slide. You may wish to use questions such as the following:

- *What do you see?*
- *What is the animal doing?*
- *How does this help a plant?*
- *Why is what they (the animal) doing important?*
- *Think of and share some other examples of animals spreading seeds or pollinating plants.*

Debrief

- What body parts (features, traits, structures) did the animals have helped them pollinate and/or spread seeds?
- How did the body part (feature, trait, structure) help the animal?

Resources

<https://www.fs.fed.us/wildflowers/pollinators/animals/index.shtml>

<https://www.fws.gov/pollinators/>

<https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/plantsanimals/pollinate/>

<https://www.pollinator.org/pollinators>

Book suggestions from: <http://www.kbs.msu.edu/wp-content/uploads/2017/02/NGSS-Interactive-Read-Alouds.pdf>

- Pallotta, J. (2010). *Who will plant a tree?* "I wonder who will plant a tree?" begins this glowingly illustrated meditation on the interconnectedness of Earth's creatures. Each page features an animal in a different habitat that, by simply going about its everyday activities, unknowingly plants a tree.
- Lawrence, E. (2012). *From bird poop to wind: How seeds get around*. Informational book that introduces young readers to the many different ways that plants disperse their seeds.
- Anthony, J. (1997). *The dandelion seed*. A story about a dandelion seed that will not let go because it's afraid of the world. Eventually, the winds blow it free and it travels the world.
- Macken, J. (2008). *Flip, float, fly! Seeds on the move*. Presents clear pictures of the featured seeds in their natural dispersals, from tumbleweeds rolling across a Western landscape to coconuts dropping into a tropical sea. Many of the double-page illustrations contain a circular "bubble" with close-ups of leaves, flowers, pods, etc.

Assessment

The following single point rubric can be used to assess student understanding. For each of the criteria listed below, either circle the proficient description or add notes to a box indicating why the student's performance was either lacking or exceptional.

Areas that need improvement.	Criteria for Proficient Performance	Evidence of exceeding standards.
Developing Performance		Advanced Performance
	Can provide examples of features of animals that help in pollination and seed dispersal.	
	Can explain why pollination is important.	
	Can explain in simple terms how to design, test, and evaluate a pollinator model.	